



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/895,865 06/29/2001 Gary J. Swanson 2847.1001-011 5881

21005 7590 01/30/2003

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.
530 VIRGINIA ROAD
P.O. BOX 9133
CONCORD, MA 01742-9133

EXAMINER

JUBA JR, JOHN

ART UNIT	PAPER NUMBER
----------	--------------

2872

DATE MAILED: 01/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/895,865

Applicant(s)

SWANSON, GARY J.

Examiner

John Juba

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10-16 and 18-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15, 16 and 18-23 is/are allowed.
- 6) ☒ Claim(s) 1-8, 10, 24, 27, 28 and 30-32 is/are rejected.
- 7) ☒ Claim(s) 11-14, 25, 26 and 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

Claims 1 – 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is believed to be incorrect in the recitation of “focused light” as issuing from the multilevel optical phase element. As argued by Applicant, the claimed multilevel optical phase element “projects” rather than focuses light. For the purposes of examination, the claims have been understood as meaning that the light modulating display is arranged to receive dispersed and *projected* light from the multilevel optical phase element, as argued by Applicant. Claims 2 – 8 contain the same incorrect recitation through their dependency from claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10, 24, 27, 28, and 30 - 32 are rejected under 35 U.S.C. § 103(a) as being unpatentable over CANON(JP A 62-293222), in view of Swanson, et al (U.S. Patent number 4,895,790). As evident by inspection, CANON '222 disclose the

invention substantially as claimed, including a broadband source of illumination(1), a phase element for dispersing(6) and projecting light rays onto an array(3) of pixels. However, CANON '222 disclose a phase element comprising a continuously blazed grating, rather than a multilevel phase element, as recited.

In the same field of endeavor, Swanson, et al teach that while it is often desirable to employ a continuously blazed diffractive phase profile in systems employing refractive elements, it has long been recognized that it is exceedingly difficult to produce high-quality, high-efficiency continuously blazed profiles (Col. 1, lines 45-65). In contrast, Swanson, et al teach that it is relatively easy to produce blazed structures of relatively high efficiency by synthesizing the desired continuous profile with a plurality of discrete phase steps. Swanson, et al teach that this permits high-efficiency blazed diffractive profiles to be produced using commonly-available lithographic patterning techniques borrowed from the semiconductor industry (Col. 4, lines 45 – 58).

It would have been obvious to one of ordinary skill to render continuous blazed phase profile of CANON '222 as a multilevel phase structure, in the interest of more easily providing the dispersing function with relatively high-efficiency, as suggested by Swanson, et al.

With regard to claims 27 and 28, the arrangement of focusing elements of CANON '222, which may be modified to include “gnat-eye” lenses, is believed to provide magnification satisfying the recited relation, and accordingly providing a dispersion element having dimensions substantially equal to those of a pixel.

With regard to claims 30 - 32, CANON '222 disclose a single polychromatic source, rather than a plurality of light-emitting diodes(LED's) or lasers. Nonetheless, the combination of a plurality of LED's or lasers to provide polychromatic display illumination was widely recognized for its more efficient, cooler, and more reliable operation than offered by a single polychromatic source. Thus, it would have been obvious to one of ordinary skill to provide a plurality of these solid-state devices, in the interest of providing longer battery life, more stable LCD operation, and greater reliability, as was well-known.

Allowable Subject Matter

Claims 15, 16, and 18 – 23 are allowable over the prior art.

Claims 11 – 14, 25, 26, and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 1 - 8 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

The following is a statement of reasons for the indication of allowable subject matter: The prior art, taken alone or in combination, fails to teach or to fairly suggest, *in combination*, the method or apparatus in which a *multilevel* optical phase element which disperses *each wavelength into multiple orders* is arranged with a light modulating display *in the near field of the multilevel optical phase element*, as recited in each of claims 1 and 15.

The prior art, taken alone or in combination, fails to teach or to fairly suggest *in combination*, the method or apparatus in which a plurality of focusing elements and a light modulating display are arranged with a *multilevel* optical phase element, which disperses *each wavelength into multiple orders*, wherein

display is at the particular distance from the multilevel optical phase element variously recited in each of claims 11, 12, 25, and 26; or wherein

the multilevel optical phase element is multilevel in two orthogonal directions, as recited in claim 24.

When read in light of the specification, and as understood by one skilled in the art, the phase element has multiple levels in the direction of optical travel, that is multiple *phase* levels. Such an element which is "multi-level in two orthogonal directions" is one in which the multiple levels are observable in two orthogonal cross sections. For example, in advancing across the element in each of two orthogonal direction, multiple levels are encountered.

Although Engelbrecht, et al (U.S. Patent number 4,079,411) teach placement of a developed photographic emulsion in the near field of a dispersive phase element, the element has a *continuous* phase profile and disperses each wavelength into a *single* diffractive order. There is no suggestion that the developed emulsion could be replaced with a "modulating display", within the accepted meaning. Although suggested for use as an array illuminator for optical processors in its near field, the multilevel phase element of Leger, et al (U.S. Patent number 5,124, 843) is disclosed for use with a single wavelength.

Response to Amendment

Applicant's amendment is sufficient in overcoming the previous duplicate claim objections under 37 CFR 1.75.

Applicant's rebuttal concerning the combined teachings of CANON (JP 62-293222 A) and Gal apparently relies upon the inference that the structures of these references were to be bodily incorporated. On the contrary, one of ordinary skill would have recognized that bodily incorporation of the particular dispersive microlenses of Gal into the display of CANON would not have accomplished the effect desired by CANON. Rather, Gal is relied upon for would have been suggested to the artisan in practicing the invention of CANON. Namely, Gal teaches integration of the phase functions associated with dispersion and focusing, and further teaches rendering the combined phase function as a multilevel phase element. In any event, the argument is moot since the claims are now directed to a very different structure than originally recited. Namely, a dispersive phase element that does not focus.

Applicant's submission of a terminal disclaimer is sufficient in overcoming the (provisional) obviousness-type double-patenting rejection of claims 2, 8, 9, 11 – 14, 16 – 19, 25, and 26 as being not patentably distinct from specific claims of U.S. Patent Application number 08/443,180, now U.S. Patent number 6,417,967.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Art Unit: 2872

Ikeda, et al disclose a display device employing a diffraction grating for color separation.

HITACHI (JP 64-003603 A) disclose a color-separating diffraction grating for a detector array.

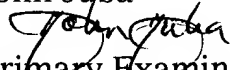
Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Juba whose telephone number is (703) 308-4812. The examiner can normally be reached on Mon.-Fri. 9 - 5.

The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

John Juba


Primary Examiner, GAU 2872

January 24, 2003